Public Technology Institute Solutions Awards

1. Population Category:

D. Over 750,000

2. Technology Category:

Geographic Information System (GIS)

3. Project Title:

Houston Plat Tracker puts the GIS in land development

4. Abstract:

Houston Plat Tracker is a System created by the Planning & Development Department, City of Houston technical staff. Through the Plat Tracker, the Planning & Development Department and other agencies regulate land development in Houston and the extra territorial jurisdiction and review, investigate and promote land regulation policies for the changing demands to Houston's growth and quality of life. Approval of development occurs on a 2 week cycle before a Planning Commission.

This in-house developed web-based system is a multi-faceted complex system, for which the GIS pieces add specific solutions. The Plat Tracker includes GIS solutions that improve and quicken the planning business process, which is all made possible by requiring a computer aided design (CAD) standard file. First a GIS Plat Verification service was created to allow the applicant to load a CAD file to verify placement in the parcel fabric before submittal. Second, a CAD to GIS automated process allows for streamlined CAD to GIS conversion which was not possible before. Processing the CAD files into GIS makes proposed land development viewable by citizens quicker and more easily than ever before via GIS online applications. It allows automation of spatial intersection of other GIS data, which reduces human error and quickens the review process.

5. Statement of the Problem:

- There is no standard land development plat format for CAD across the surveying industry.
- AutoCAD layers were not entered into the GIS due to this lack of consistency and standards and due to staff limitations because it required manual data entry.
- Planning staff needed to verify if a CAD file was correctly geo-references or in the correct location in GIS before accepting them.
- Several geospatial attributes, such as city limit, city council, and taxing parcels were manually entered on the application by the applicant.
- Planner staff would use GIS for reference only in verifying the geospatial attributes. Much effort was taken to correct the data entered by the applicants.

6. Response:

Planning staff developed a multi-layer CAD file template called a *Registry Drawing* with instructions all downloadable from the Plat Tracker home page. The Plat Tracker requires this file when an applicant submits for land development approval.

To resolve the CAD geo-reference issues, GIS technical staff designed a secure web form (Exhibit A) as part of the Plat Tracker for input of the Registry Drawing file, county (for projection) and scale factor for verifying the GIS location of the plat. A simple JavaScript map (Exhibit B) is used to render the plat in the parcel land base or fabric; this rendering is the result of an ESRI ArcGIS service processing the CAD file and parameters on city servers.

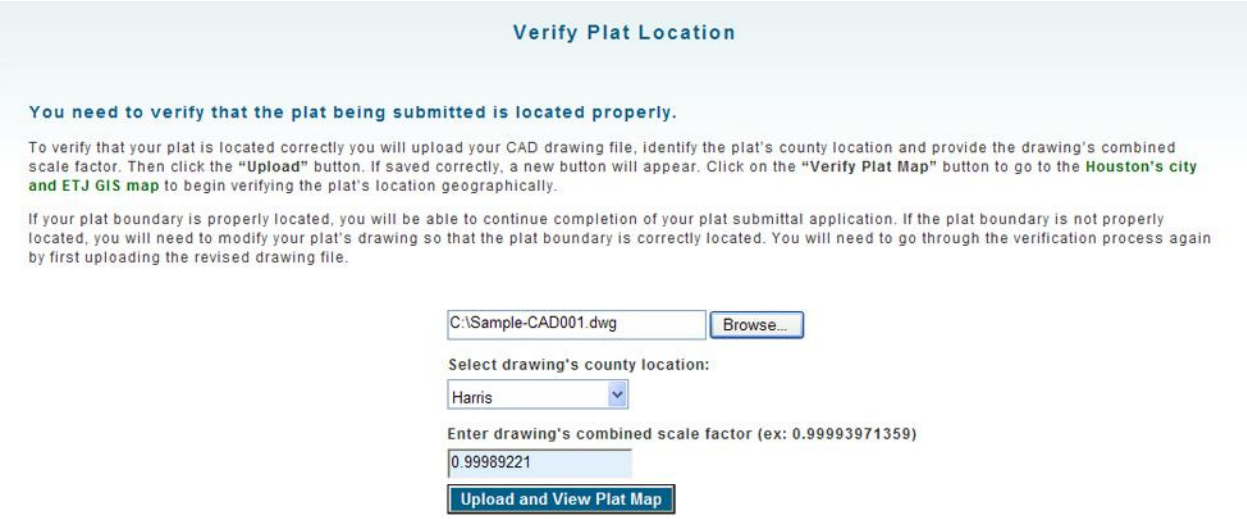

Exhibit A: Input Form

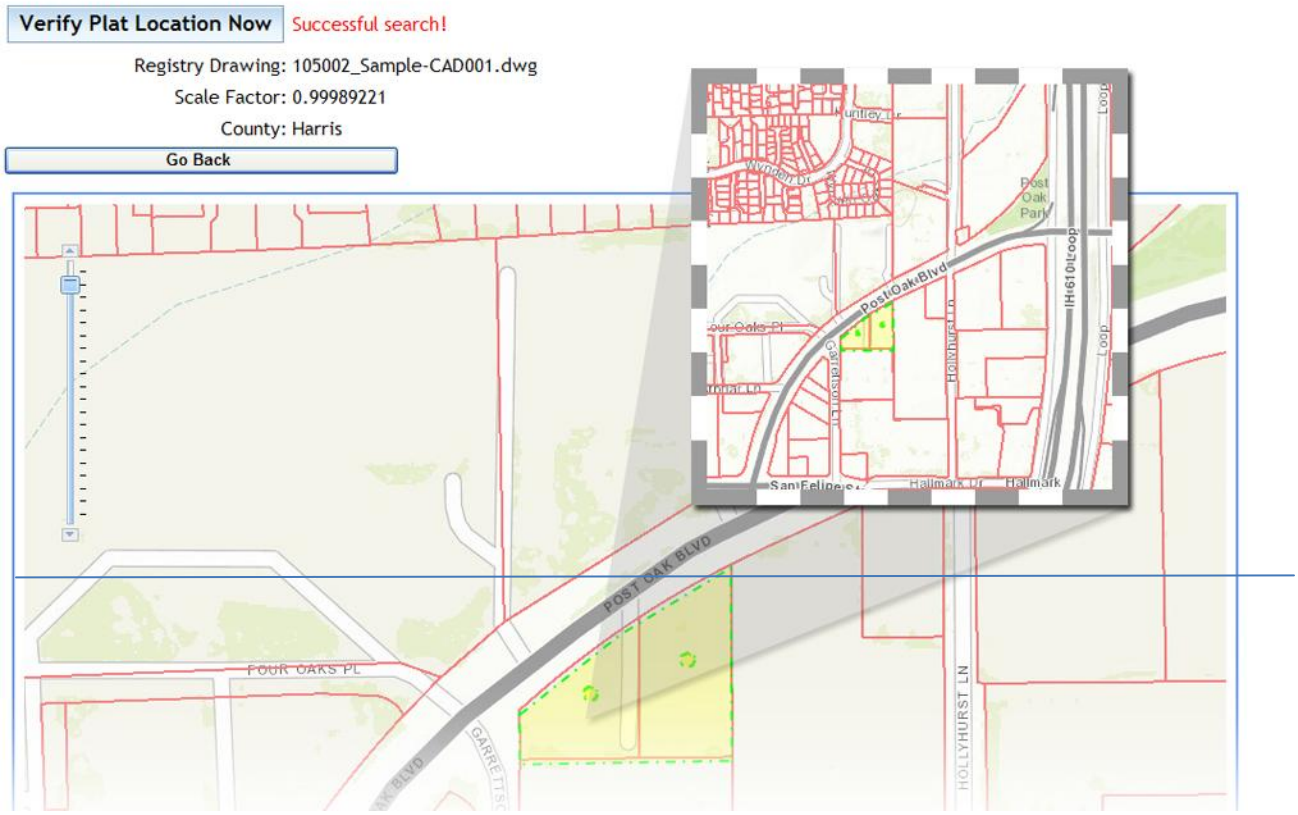

Exhibit B: Plat Verification Map

GIS technical staff designed a process and executable to migrate the CAD Registry Drawing file into the GIS database to resolve the GIS issues. This is a 2 part process that first, imports the CAD layers into Geodatabase features, such as lines and polygons and annotations. The end resulting GIS layers are replicated to Enterprise GIS and consumable as a service in both desktop and web tools. The 2nd part takes the boundary polygon of the result and intersects with over 33 GIS Enterprise features, such as city limit, city council, neighborhood, map grid, utility district, taxing parcels, etc., to populate a SQL table with the spatial components.

The planner staff set the process to run only after checking the Registry Drawing is correct and verifying its location in GIS. Due to logs in the database, the status of the CAD to GIS conversion can be seen in a report. Due to anywhere from 80-120 plat applications submitted per cycle, it takes time to process. They sit in a queue on the server and are processed sequentially, each one taking average of 10 minutes. After completion of this behind the scenes process, the GIS layers are available online and the GIS data is available for review by staff from within Plat Tracker (Exhibit C).

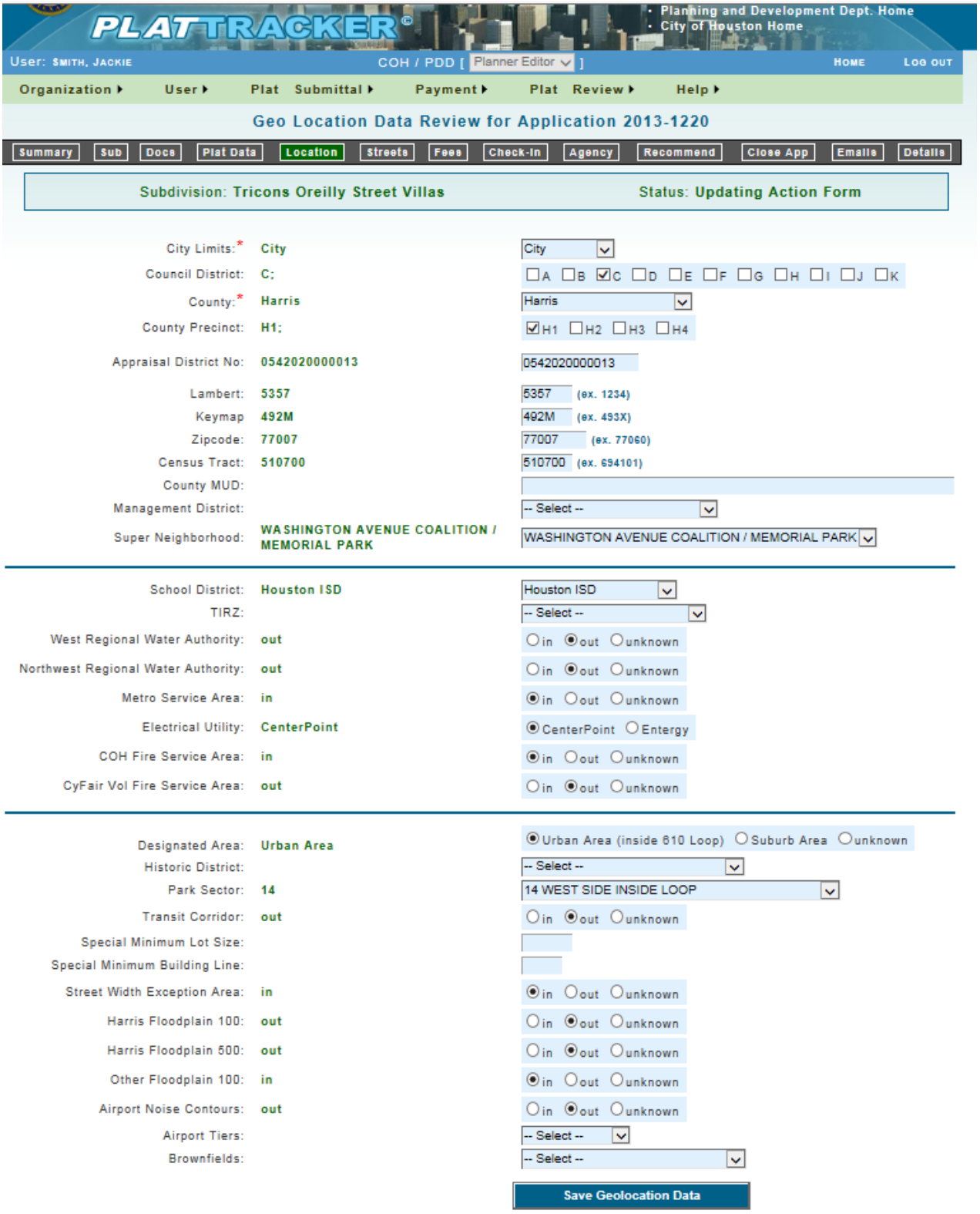

Exhibit C: GIS Attributes in green system generated

7. Results:

The results are quite substantial. The Registry Drawing template allows for tremendous time saving gains that only GIS can provide. By pre-validating the location of the plat in GIS before submittal, there is minimal delay caused by discrepancies in the CAD files between the City planners and the land developers and surveyors. This increased the time plats can be approved by days. The incorrect CAD files could cause days of setback involving email correspondence and staff time. Since the cycle is set at 2 weeks intervals, this could be the difference between not getting funding for a development.

The GIS solution provided by the team has enabled automation into GIS from the CAD file and saved manual effort normally done by a GIS technician. Before, the CAD files were too varying to import into GIS in a reliable, standardized way. Because of the recession, the department had to lay off 2 GIS technicians that assisted with locating CAD files and preparing maps for Planning Commission. Now the CAD to GIS Automation replaces the need to replace those FTE's.

The CAD to GIS conversion promotes transparency to the public. Before, there was no easy way to notify constituents of development in their neighborhoods. They had to read Agenda spreadsheets and documents online, searching for the correct address or subdivision references on location and relying on the manually entered spatial attributes, such as user entered City council or Neighborhood.

Now, they can enter an address or zoom to their location using a GIS viewer, such as MyCity Houston and turn on proposed and approved plat development as a layer in GIS (Exhibit D). They can turn on and off labels and annotation to get more or less information about the plat. This functionality has never been available before and we have barely begun to leverage the benefit this provides the citizens and competing land developers.

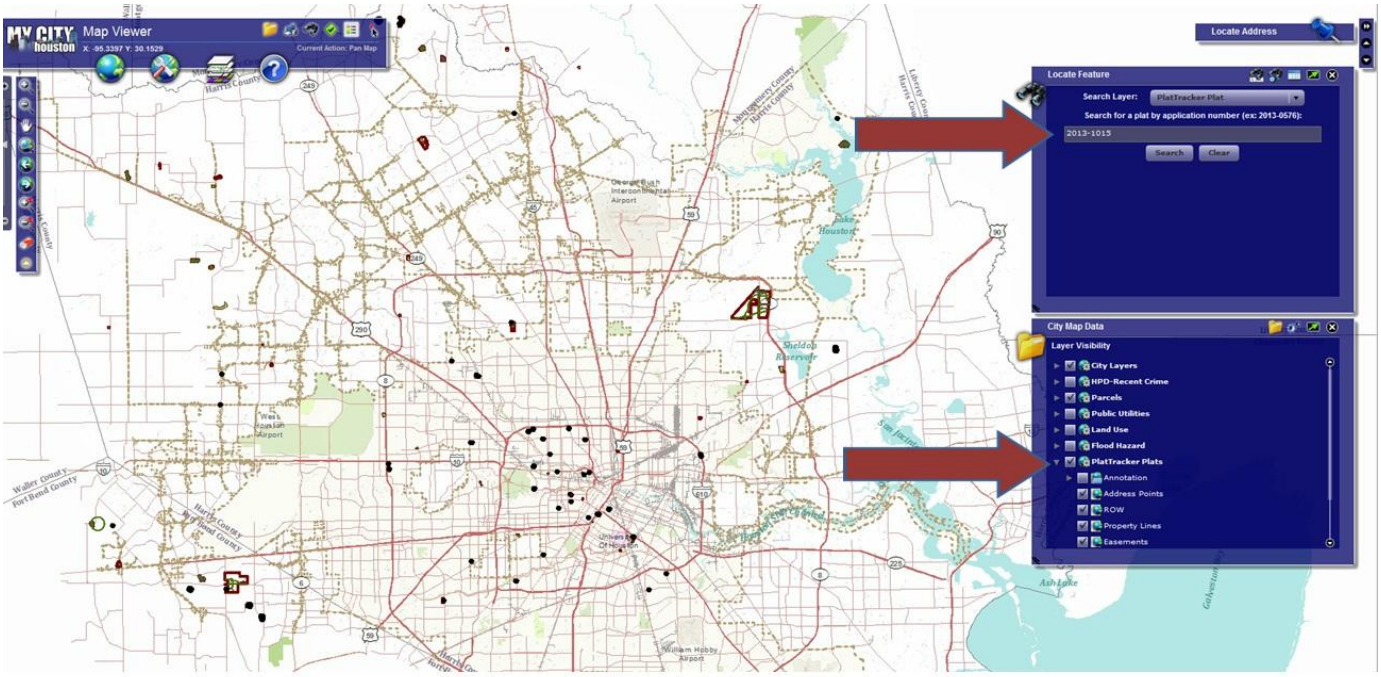

Exhibit D: MyCity Houston with Plat Layers visible

The GIS solution of CAD to GIS conversion has saved manual effort normally done by the client. The client no longer has to enter the spatial attributes of a submitting plat or CAD file. This saves the clients on average 10 minutes to several hours, depending on the research needed to find the multiple location details about a plat. This is now done by the system.

The City staff reviewer does not have to correct those spatial attributes entered manually by the applicant. Because manual data entry can increase human error, city staff would have to re-type several attributes or research to correct the wrong spatial attributes. This took additional time, because the reviewer had to pull up GIS tools and eye ball where the plat would be to gage what the various spatial attributes should be. Since the system populates the data, now all the city staff reviewer has to do is confirm the spatial attributes that were processed by the CAD to GIS automation (Exhibit C). Furthermore, because the GIS layers are created, staff can consume the same plat layers used for the public in MyCity Houston in their own GIS Desktop tool. Time spend eye balling the location of a plat, digitizing or geo-referencing a CAD boundary is now saved.

8. Key Participants:

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Shen Wang, Sr. GIS Analyst, Database architect

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Hassan Sedaghat, GIS Supervisor, Programmer

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